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NOTES ON THE LEPUSCULINA-LEPORINA SERIES OF APATELA

(Lepid., Phalaenidæ, Apatelinæ*)

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The notes in this paper are the result of identifications of specimens submitted from various sources.

The assistance of Messrs. K. Wyatt and Emil Beer is gratefully acknowledged. Both of these entomologists kindly donated aberrant specimens forming natural connecting links between several forms previously considered valid species, and the latter worker very kindly gave the author a series of specimens reared from a single caught female, as discussed in the text.

The problem was complicated by the type series of four of the names representing mixtures of species or varieties. Eleven specific names have been placed as synonyms, three names have been reduced to the status of mere colorational or maculational forms, five names have been reduced to subspecific rank, a European species has been eliminated from the North American fauna except as represented by indigenous subspecies with the consequent elevation to subspecific status of a name usually considered a synonym, and a single new subspecific name has been erected to rectify previous errors.

APATELA LEPUSCULINA Gn.

1852. Guenée, Spec. Gén., I, 46, *Acronycta*.
1922. McDunnough, Can. Ent., LIV, 138-139, *Acronycta*.
populi Riley.
1870. Riley, 2nd Rept. Ins. Mo., p. 119, ff. 87-88, *Acronycta*.
cretata Sm. (partim. male nec female).
1897. Smith, Ent. News, VIII, 148, *Acronycta*.
1898. Smith & Dyar, Proc. U. S. N. M., XXI, 58, pl. XI, f. 3 (nec
f. 4); pl. XVII, f. 15; pl. XIX, f. 18, *Acronycta*.
cinderella Sm. (partim, male nec female).

*Noctuidæ, Acronyctinæ of authors.

1897. Smith, Ent. News, VIII, 149, *Acronycta*.
 1898. Smith & Dyar, Proc. U. S. N. M., XXI, 64, pl. XI, f. 11, *Acronycta*.
chionochroa Hamps.
 1909. Hampson, Cat. Lep. Phal. B. M., VIII, 136, pl. CXXVI, f. 13, *Acronycta*.
 form *transversata* Sm.
 1897. Smith, Ent. News, VIII, 149, *Acronycta*.
 1898. Smith & Dyar, Proc. U. S. N. M., XXI, 65, pl. X, f. 10, *Acronycta*.
 ‡*cinderella* Sm. (partim. female nec male).
 1897. Smith, Ent. News, VIII, 149, *Acronycta*.
 1898. Smith & Dyar, Proc. U. S. N. M., XXI, 64, *Acronycta*.
 form *canadensis* Smith & Dyar.
 1898. Smith & Dyar, Proc. U. S. N. M., XXI, 57, *insita* var., (an sp. dist.), *Acronycta*.
 1904. Dod, Can. Ent., XXXVI, 353, *Acronycta*.
 form *similana* Sm.
 1905. Smith, Jour. N. Y. Ent. Soc., XIII, 190, *Acronycta*.
tonitra Sm.
 1908. Smith, Jour. N. Y. Ent. Soc., XVI, 83, *Acronycta*.
 subspecies *felina* Grt. (partim. male nec female).
 1879. Grote, Bull. U. S. Geol. Geog. Surv., V, 208, *Apatela*.
 1909. Hampson, Cat. Lep. Phal. B. M., VIII, 128, pl. CXXVI, f. 3, *Acronycta*.
 1911. Smith, Ent. News, XXII, 311, *Acronycta*.
 ‡*lepusculina* Auct.
 1888. Hy. Edwards, Ent. Am., III, 185, *Apatela*.
frigida Sm. (partim. male and female types, nec "co-types").
 1897. Smith, Ent. News, VIII, 148, *Acronycta*.
 1898. Smith & Dyar, Proc. U. S. N. M., XXI, 54, pl. XI, ff. 6 & 10, *Acronycta*.
 1916. Barnes & McDunnough, Contrib. Nat. Hist. Lep. N. Am., III, (3), 165, pl. XIII, ff. 1-2, *Acronycta*.
pacifica Sm.
 1897. Smith, Ent. News, VIII, 148, *Acronycta*.
 1898. Smith & Dyar, Proc. U. S. N. M., XXI, 56, pl. XI, f. 5, *Acronycta*.
 subspecies *cyanescens* Hamps.
 1909. Hampson, Cat. Lep. Phal. B. M., VIII, 129, pl. XXVI, f. 5, *Acronycta*.
 1911. Smith, Ent. News, XXII, 311, *Acronycta*.
 ‡*felina* Grt. (partim. female nec male).
 1879. Grote, Bull. U. S. Geol. Geog. Surv., V, 208, *Apatela*.
 1888. Hy. Edwards, Ent. Am., III, 185, *Apatela*.
 1897. Smith, Ent. News, VIII, 148, *Acronycta*.

1898. Smith & Dyar, Proc. U. S. N. M., XXI, 53, pl. XI, f. 9, *Acronycta*.
1904. Dyar, Proc. U. S. N. M., XXVII, 798-799, *Apatela*.
1916. Barnes & McDunnough, Contrib. Nat. Hist. Lep. N. Am., III, (3), 165-166, *felina*, *Acronycta*.
‡*frigida* Sm. (partim. "cotypes," nec types male and female).
1897. Smith, Ent. News, VIII, 148, *Acronycta*.
1898. Smith & Dyar, Proc. U. S. N. M., XXI, 54, *Acronycta*.
1911. Smith, Ent. News, XXI, 311, *Acronycta*.
1916. Barnes & McDunnough, Contrib. Nat. Hist. Lep. N. Am., III, (3), 165-166, *felina*, *Arconycta*.
metra Sm.
1911. Smith, Ent. News, XXII, 311, *Acronycta*.
1912. Barnes & McDunnough, Contrib. Nat. Hist. Lep. N. Am., I, (4), 39, pl. XVIII, ff. 1-2, *Acronycta*.
1916. Barnes & McDunnough, Contrib. Nat. Hist. Lep. N. Am., III, (3), 166, *felina* local form, *Acronycta*.
turpis Sm.
1911. Smith, Ent. News, XXII, 311, *Acronycta*.
1916. Barnes & McDunnough, Contrib. Nat. Hist. Lep. N. Am., III, (3), 166, *felina* local form, *Acronycta*.
amicora Sm.
1911. Smith, Ent. News, XXII, 312, *Acronycta*.
1916. Barnes & McDunnough, Contrib. Nat. Hist. Lep. N. Am., III, (3), 166, *felina* local form, *Acronycta*.

The names *populi* and *chionochroa* have already been sunk to *lepusculina*¹ by Dr. McDunnough². The type of *populi* is in the National Museum. The name *chionochroa* is a nomen novem based on the *lepusculina* of the Smith and Dyar paper, so that the Smith specimens in the National Museum may be considered types.

McDunnough, however, goes further and considers *canadensis* as a dark western race; *cinderella*, with *transversata* as a probable synonym, as the name for the Colorado form, and comments on a white form² likely to be confused with *cretata*, which he treats as a race of *leporina*; the other forms discussed herein being omitted save for a casual reference to *frigida*.

In reality the male type of *cretata* is an extremely pale Colorado specimen of *lepusculina*. As Smith definitely split *cretata* from *leporina* on the basis of the genitalia and tarsi of

¹ The Barnes material contains a photograph of the type of *lepusculina* (Paris Museum) from M. Le Cerf through the kindness of Dr. McDunnough.

² 1922, Can. Ent., LIV, 138-139.

this male type, there seems nothing to do but to consider this specimen as the real type. Accordingly it is hereby designated the lectotype. Similar pale specimens are in the Museum collection from Aweme and Miniota, Manitoba; from Colorado; from Illinois; and from Pennsylvania. In view of the distribution, a separate name for these somewhat paler individuals seems of no significance.

The name *cinderella* is based on Colorado examples of *lepusculina*. Specimen for specimen these can be matched with normal eastern material, and the name seems to have no racial significance. The male type, hereby designated the lectotype, is a normal specimen. The female type shows the median shade of *transversata* well developed, and falls into that form.

The name *transversata* is based upon Colorado examples possessing a median shade. The form is more common in Colorado than in the East, but as the majority of Colorado specimens fall to *lepusculina* (*cinderella*), and as a specimen from New Brighton, Pa., is a good match for the types (male and female) of *transversata*, the name seems to have no significance except possibly as a minor maculational form.

The name *canadensis* is applicable to the powdery gray form, which is apparently more common in Alberta than elsewhere, but is duplicated by Illinois individuals and closely approximated by a specimen from Clearfield, Pa. In reality the form is simply an intermediate to the melanistic *similana*.

The names *similana* and *tonitra* are based on melanistic specimens, the latter name having little or no significance. All specimens seen by the author are from the region including Chicago, Ill., and St. Louis, Mo.

Through the kindness of Messrs E. Beer and K. Wyatt, the author was given a series of thirteen specimens of *lepusculina* forms bred by Mr. Beer from a single female *similana*. Eight specimens of this series are *similana* (*tonitra*), one specimen is *canadensis*, and the other four are intergrades between *canadensis* and *lepusculina*, superficially somewhat similar to western *felina* (*frigida*=*pacifica*) in appearance.

Grote described *felina* from a male in his own collection and a female loaned to him by Henry Edwards, citing the difference between the two types which is the difference between

the subspecies subsequently described as *frigida* (*pacifica*) and *cyanescens*. Hampson's figure (1909) agrees perfectly with Grote's description of the male type (= *frigida*); but not with the female type, in the Henry Edwards Collection³, nor with the so-called type (presumably spurious) in the Tepper Collection⁴. The female type is the dull powdery gray form with indistinct lines figured by Barnes and McDunnough (1916). Hampson (1909) had not isolated any specimens under the names *frigida* or *pacifica* for the reason that he already had the name *felina* available. He recognized that *felina* (male type) was different from the dull gray form, and described the latter under the name *cyanescens*. Smith (1911) concurs with Hampson's action. To avoid further confusion the male type of *felina* in the British Museum is hereby designated the lectotype for the name.

The name *frigida* presents a rather complicated problem. The name is a misnomer as applied to the male and female types (from Alameda Co., Calif.; in the National Museum). Nevertheless these are the actual type specimens and must hold the name. Besides these types, Smith (1897) obviously had specimens of *cyanescens* (*felina* female nec male) included in his concept, hence the name *frigida*. Two of Smith's "cotypes" of *frigida* (1897) are in the material received with the Barnes Collection, are labeled Victoria, Vancouver, and are normal *cyanescens*. These were not included by Smith and Dyar (1898) under the name *frigida*, but the *frigida* of the latter date was also mixed with *cyanescens* according to Barnes and McDunnough (1916), and as shown by Smith under his description of *metra* (1911), the Rutgers College "cotype" of *frigida* being *cyanescens*.

The male type of *pacifica* (Henry Edwards Collection) is stated by Barnes and McDunnough (1916) to be identical with the National Museum types of *frigida*. The female type of *pacifica* is in the National Museum. It is the same form as the type of *frigida*. To avoid any chance of confusion this female type is hereby designated the lectotype for the name *pacifica*.

A long series of *felina* (*frigida*=*pacifica*) is before the au-

³ A specimen compared by J. McDunnough and a second specimen compared by Wm. Barnes are in the U. S. National Museum Collection.

⁴ A specimen compared by J. McDunnough is in the U. S. National Museum Collection.

thor from Mission San Jose and Irvington, Alameda Co., and from Eldridge, Sonoma Co., Calif., and no specimens have been seen which have definitely been labeled as originating in any other California locality. Individuals of this subspecies can easily be confused with individuals of *lepusculina*. No single character seems to be available for sorting. Nevertheless, the series as a unit appears relatively compact, the specimens being dull powdery gray and closely resembling aberrant *lepusculina* intermediate to form *canadensis*, but averaging somewhat smaller in size, with the transverse posterior line usually not quite so heavily marked, and the transverse anterior line with more of a tendency toward obsolescence. The frons seems very slightly more bulged on an average. The harpe is often somewhat shorter and broader, the clasper somewhat more twisted. But each of the above characters has been matched in some specimen of eastern *lepusculina*. The larvæ, according to two inflated specimens bearing the same Riley rearing number as the male and female types of *frigida*, are similar to those of *cyanescens*, differing from eastern *lepusculina* in the reduced length of the dorsal black hair pencils. These shorter black hairs are definitely tapered at the tips, and the shorter length is not the result of breakage. The subspecies, therefore, occupies the status of an existing intermediate between *lepusculina* and *cyanescens*.

With the names *felina*, *frigida*, and *pacifica* restricted to the subspecies of *lepusculina* which occurs in the vicinity of San Francisco, the name *cyanescens* becomes the first available name for the subspecies from the higher altitudes (*felina* female nec male; *frigida* cotypes nec types). The type male of *metra* was described from a Barnes Collection specimen, and accordingly was returned, as was the unique type female of *amicora* which obviously by its label was also loaned to Smith by Barnes. A specimen compared by Dr. Barnes with the unique type of *turpis* (Rutgers College) is before the author. The differences between the types are so obsolescent that one is constrained to wonder just why so many names were created. The slight differences which do exist between the Smith (1911) types are shown by a series from various localities to be individual variation caused by a few more or a few less black scales.

Upon casual examination *cyanescens* appears to be spe-

cifically distinct from *lepusculina*. The frons seem very slightly more bulged, the vestiture of the thorax with the scales somewhat narrower and more hairlike, in this latter character tending slightly toward *leporina*. The fore wing usually appears to be a little stronger and a little more pointed than in normal *lepusculina*. Nevertheless no character which appears to have any specific significance could be found in the genitalia. These organs in *cyanescens* tend to have the harpes somewhat shorter and wider, as an average, than the harpes of *lepusculina*, and the claspers tending to be somewhat more crooked. These characters are shown to be of little significance in a series of thirteen slides of *lepusculina* as contrasted with four slides of *cyanescens* and three slides of *felina*. The other structures of the male genitalia appear to be identical in the three subspecies, except the vinculum, which shows slight individual variation not restricted to any locality or form. The genitalic characters cited in the Smith and Dyar revision (1898) are based on slides which are before the author. These slides consist only of fragments of the genitalia, the harpes and claspers often broken or distorted, the fragments in all manner of positions. The differences illustrated in this revision between the so-called species herein included under *lepusculina* are largely a combination resultant of individual variation, differences in position of the corresponding parts on the respective slides, and distortion of the fragments.

The larva of *cyanescens* has been described by Dyar (1904) under the name *felina*, and a series of these same specimens are in the National Museum. Just how much the hair is curved like that of *leporina* (see Dyar, 1916) the author is unable to state. Only a single inflated larva shows any curvature to the hair, and that looks like the result of inflation. On the other hand possibly the hairs have straightened out owing to inflation of the larval skins. The dorsal black tufts are short, similar to those of *felina* (*frigida*=*pacifica*), subequal to the normal hair⁵.

⁵ Mr. Carl Heinrich has carefully studied the larvæ of *lepusculina* and *cyanescens*, and states that he cannot find any character to separate these except the shortened hair pencils of the latter. He could observe no differences in the setæ of the heads. Recently Mr. S. E. Crumb studied the same specimens of larvæ and was unable to find other differences.

The larvæ of all three subspecies presumably feed on the willow-poplar group of plants. The author has reared *lepusculina* on poplar; the *felina* and *cyanescens* larvæ in the Museum Collection are from willow.

Were it not for *felina* (*frigida*) the author might be inclined to consider *cyanescens* to be a valid species, with genitalia similar to those of *lepusculina*, and the larvæ differing mainly by the shortening of the black dorsal hair pencils. However with *felina* (*frigida*) having a larva like that of *cyanescens*, but so similar to aberrant *lepusculina* that no single character will serve to separate the adults, a single species is indicated.

APATELA LEPORINA L.

1758. Linnæus, Syst. Nat., Ed. X, p. 510, No. 79, *Phalena Noctua*.
subspecies *vulpina* Grt.
1883. Grote, Can. Ent., XV, 8, *Apatela*.
1904. Dyar, Proc. U. S. N. M., XXVII, 799, *leporina* race, *Apatela*.
sancta Hy. Edw.
1888. Hy. Edwards, Ent. Amer., III, 185, *populi* var., *Apatela*.
subspecies *cretatoides* Benj.
cretata Sm. (female nec male).
1897. Smith, Ent. News, VIII, 148, *Acronycta*.
1898. Smith & Dyar, Proc. U. S. N. M., XXI, 58, pl. XI, f. 4,
(nec pl. XI, f. 3; pl. XVII, f. 15; pl. XIX, f. 18), *Acronycta*.
1904. Dod, Can. Ent., XXXVI, 353, *Acronycta*.
1904. Dyar, Proc. U. S. N. M., XXVII, 799, *leporina* race, *Apatela*.
1922. McDunnough, Can. Ent., LIV, 139, *Acronycta*.
subspecies *mæsta* Dyar.
1904. Dyar, Can. Ent., XXXVI, 29, *leporina* var., *Apatela*.
1904. Dyar, Proc. U. S. N. M., XXVII, 799, *leporina* race, *Apatela*.
subspecies *cassinoides* B. & Benj.
1926. Barnes & Benjamin, Can. Ent., LVIII, 309, (*leporina* race?),
Apatela.

A. leporina is closely allied to *lepusculina*.

The last-stage larva of *leporina* lacks the black dorsal hair pencils of *lepusculina*. All larvæ of *leporina* seen by the author have pale heads which may be more or less heavily marked with dark brown or black, especially latero-cephalically and ventrally. All larvæ of *lepusculina* and any of its varieties seen by the author have black heads except for one of the two larvæ of *felina* (*frigida*), which has a dark rufous brown head⁶. Typically the larva of *leporina* tends to have the hair arranged in a whorl, while typically the hair is straighter in *lepusculina* (eastern specimens). Dyar, 1904, under the name *felina*, has

⁶ Possibly inflated shortly after molting.

described the larva of *cyanescens* as having the hair arranged as in *leporina*⁷.

The main superficial difference between adults of the two species is the more hairy thorax of *leporina* as contrasted with that of *lepusculina*, although each species has a characteristic habitus which is practically impossible to describe.

The genitalia of both species are very similar. The harpes and claspers of *leporina*, as in *lepusculina*, are individually variable in their exact shapes, both species closely approximating one another. The unci of both are variable individually in regard to exact width; but the uncus of *leporina* is only bulged distally, the mesial edge of the long hooked portion being slightly excurved; whereas the uncus of *lepusculina* is bulged both distally and mesially. The ridged plate of the ædœagus of *leporina* is approximately half as long as the ædœagus; whereas this plate in *lepusculina* is shorter and narrower, being slightly more than one-third the length of the ædœagus. These differentiating characters appear quite constant in twenty slides of *lepusculina* representing not only typical *lepusculina*, but the various color forms, and the subspecies *felina* and *cyanescens*; and in six slides of *leporina* representing not only typical *leporina* but the subspecies *vulpina*, *cretatoides*, *mæsta*, and *cassinoides*. The female genitalia are quite similar in the two species. A slight difference exists in the exact shape of the collars of the eighth segment, *lepusculina* having the mesiocephalic prolongations of this segment broader at their base than the same structures of *leporina*. The terminal segment of *lepusculina* is somewhat larger than that of *leporina*. These characters are solely of degree, and at least some variation is to be anticipated.

In North America *leporina* has a much more restricted distribution than *lepusculina*, being found in New York and New England, through Canada from Nova Scotia to Vancouver, extending southward in the mountains of Colorado and New Mexico. It is much less common than *lepusculina*, less subject to individual variation, but more productive of local and well marked racial forms.

⁷ See notes under the heading *lepusculina*.

The name *vulpina* is retained for the race of *leporina* found in the northeastern part of the United States and southeastern Canada. Specimens before the author are labeled N. Y., Mass., N. Hamp., and Nova Scotia.

Superficially in the male this race closely approaches the European *leporina* with a tendency for females to possess markings similar to those of *cretatoides* (*cretata* Sm. female nec male), as exemplified by a New York female identified "*cretata*" by Smith. The spines on the penis of all of the North American forms are not quite so long as those found in the single European male which was available for study.

The name *cretatoides* is applied to the Colorado race⁸. The female has been figured by Smith and Dyar (1898). The male is entirely similar to the female, differing markedly from *vulpina* by the black powderings, the emphasized maculation, and averaging considerably larger in size.

Two specimens from Ontario, six specimens from Manitoba, and one specimen from Vancouver seem to represent intermediates, connecting *vulpina*, *cretatoides*, and *mæsta*.

The name *mæsta* represents a darker powdery gray race from Kaslo, B. C. Dyar overemphasized the dark powdering in his original description by citing *mæsta* as being the color of *canadensis*. The type series is not much more heavily powdered with black than many normal specimens of eastern *lepusculina*, the black powdering being about as in *A. dactylina* Grote but with no brown tintings.

The name *cassinoi* is known to the author only by the unique male type. The maculation is more intensified than in the best marked specimens of *cretatoides*; the reniform elongated, practically joining the black spot on the costa; the basal dash not broken mesad of the transverse anterior line; the transverse posterior line distally strongly marked with black; heavy black powderings distal of this line and in the region below the cell; with a well marked tornal dash and with a heavy black line along the inner margin from the region of the transverse anterior line to the transverse posterior. Thus the form has gone beyond *cretatoides* in contrasts but is in part as heavily black powdered as the darkest *mæsta*.

⁸ See notes under *lepusculina*.

The genitalia of the type differ from all other *leporina* forms by having the ventral edge of the harpe nearly straight, forming with the dorsal edge the acute sides of a right-angled triangle. The character is probably purely individual, but is cited because it exists, and will demonstrate the variation in *leporina* which usually possess a rather lobate harpe.

Apatela leporina cretatoides, Benjamin, new subsp.

The characters have been cited in preceding paragraphs.

Expanse: Male, 43-45 mm.; female, 50-51 mm.

Type localities and number and sex of types: Holotype male, Glenwood Springs, Colo., July 24-30; allotype female, id., July 16-23 ("cotype" of "*cretata*"); three male paratypes, id., July 16-23, Aug. 16-23, and no date; one female paratype, Garfield Co., Colo., 7,000 ft., (Bruce) ("Type female" of "*cretata*"). Cat. No. 44328, U. S. N. M.

NOTES ON *AMBRYsus* MORMON MONTD.

(Hemiptera, Naucordiæ)

Although the members of the genus *Ambrysus* are naucorids usually associated with rapidly flowing streams, a very interesting species has been observed for the last two years in the waters of Clear Lake, Lake County, California. In this large inland lake the waters are not fast flowing and the adaptation of this insect to such waters is very interesting.

Toward the latter part of June nymphs and adults were collected among the lake weeds or more commonly by turning over rocks, whereupon they would dart quickly to the surface and then down again. They were found associated with several belostomids, dytiscids, numerous insect larvæ, a common amphipod, probably *Hyaella knickerbockeri*, a fresh water snail and a leech.

The species has been tentatively determined by Mr. R. L. Usinger as a variety of *Ambrysus mormon* Montd., to which it is closely related, but differs conspicuously by its uniform smaller size.—W. Harry Lange, Jr.